Wear Resistant Tubing
TUZ Series

Abrasion: Approx. 1/3
(Compared with SMC polyurethane tubing TU series)

<table>
<thead>
<tr>
<th>Description</th>
<th>Maximum abrasion (mm) After 10 million cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear resistant tubing TUZ series</td>
<td>0.16</td>
</tr>
<tr>
<td>Polyurethane tubing TU series</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Note) Comparison based on the SMC's specific testing condition
Wear Resistant Tubing

TUZ Series

**Model**

<table>
<thead>
<tr>
<th>Model</th>
<th>TUZ0212</th>
<th>TUZ3220</th>
<th>TUZ0425</th>
<th>TUZ0604</th>
<th>TUZ0805</th>
<th>TUZ1065</th>
<th>TUZ1208</th>
<th>TUZ1610</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubing O.D. (mm)</td>
<td>2</td>
<td>3.2</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Tubing I.D. (mm)</td>
<td>1.2</td>
<td>2</td>
<td>2.5</td>
<td>4</td>
<td>5</td>
<td>6.5</td>
<td>8</td>
<td>10</td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air/Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable fittings</td>
<td>One-touch fittings KQ2 series, Insert fittings KF series, Stainless steel 316 insert fittings KFG2 series, Miniature fittings M/MS series (hose nipple type)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Max. operating pressure (MPa)</th>
<th>20°C</th>
<th>40°C</th>
<th>60°C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8</td>
<td>0.6</td>
<td>0.4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Min. bending radius (mm)</th>
<th>4</th>
<th>10</th>
<th>10</th>
<th>15</th>
<th>20</th>
<th>27</th>
<th>35</th>
<th>45</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Operating temperature (°C)</th>
<th>−20 to +60°C (Water: 0 to 40°C) (No freezing)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Material</th>
<th>Special polyurethane</th>
</tr>
</thead>
</table>

Note 1) The minimum bending radius means the value measured by the method shown in the figure at the right at the temperature of 20°C when the tube is bent. The minimum bending radius assumes static piping. If the tube is used in a moving part, provide extra length to the tube. Check the bending radius recommended by the flexible protection tube manufacturer for sure if the tube is used in the flexible protection tube.

Note 2) Applicable for general industrial water. Please consult with SMC if using other kinds of fluid. Surge pressure must be under the max. operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes.

Note 3) Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

**Max. Operating Pressure**

![Graph showing max. operating pressure vs. operating temperature]

**How to Calculate Minimum Bending Radius**

Bend the tube into U-form at the temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the tube breaks or is crushed.

**How to Order**

![Table showing tubing model, color, length per roll]

Note) Not clear, but translucent due to material.
### Reference Data: Abrasion due to Flexible Protection Tube

#### Test Conditions

<table>
<thead>
<tr>
<th>Test tube</th>
<th>TUZ0604, TU0604</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quantity of tube tested</td>
<td>5 pcs. for each</td>
</tr>
<tr>
<td>Operating speed</td>
<td>1500 mm/sec</td>
</tr>
<tr>
<td>Operating frequency</td>
<td>90 c.p.m</td>
</tr>
<tr>
<td>Stroke L</td>
<td>500 mm</td>
</tr>
<tr>
<td>Bending radius R</td>
<td>28 mm</td>
</tr>
<tr>
<td>Material of flexible protection tube</td>
<td>Special engineering plastic</td>
</tr>
<tr>
<td>Tube tie</td>
<td>Not used</td>
</tr>
</tbody>
</table>

#### Test Results

<table>
<thead>
<tr>
<th>Model</th>
<th>Maximum abrasion after 10 million cycles (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TUZ0604</td>
<td>0.16</td>
</tr>
<tr>
<td>TU0604</td>
<td>0.46</td>
</tr>
</tbody>
</table>

As this test was an acceleration test, the tube bending radius was out of the flexible protection tube manufacturer's allowable range. When the flexible protection tube is used in the actual application, check the manufacturer's catalog specifications. The values in the table above are representative values, and not guaranteed.

#### Made to Order

**Multi-core, same color specification** TFU-X73  
**Flat type of the TUZ series**  
Number of cores: 2 to 12 cores  
Specification: Same color  

**Multi-core, multi-color specification** TUZ-X169 to X172, -X204  
Number of cores: 2 to 12 cores  
Specification: Multi-color  
Refer to page 478 for details.

The identification line is not shown. Please contact SMC for detailed specifications, dimensions, and delivery.

#### How to Order

**TFU0425 BU**  
**2**  
**20**  
**X73**

**Tubing model**

<table>
<thead>
<tr>
<th>Model</th>
<th>O.D. x I.D. (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TFU0425</td>
<td>4 x 2.5</td>
</tr>
<tr>
<td>TFU0604</td>
<td>6 x 4</td>
</tr>
<tr>
<td>TFU0805</td>
<td>8 x 5</td>
</tr>
<tr>
<td>TFU1065</td>
<td>10 x 6.5</td>
</tr>
<tr>
<td>TFU1208</td>
<td>12 x 8</td>
</tr>
</tbody>
</table>

**Special polyurethane**  
(Multi-core, same color specification)

**Length per roll**

- Nil 10 m
- n m

Note) It is also available in lengths other than 10 m. Enter the length you need (1, 2, 3, 4, 5, 20). Example) TFU0425BU-2-20-X73

**Number of cores**  
2 to 12

Note) Not clear, but translucent due to material.
Wear Resistant Flat Tubing
Multi-core, Multi-color Specification

**TUZ Series**

**Compact piping possible**
**6 color variations**

**Abrasions:** Approx. 1/3

* Compared with SMC polyurethane tubing TU series (Refer to the table below)

<table>
<thead>
<tr>
<th>Description</th>
<th>Maximum abrasion (mm) After 10 million cycles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear resistant tubing</td>
<td>0.16</td>
</tr>
<tr>
<td>TUZ series</td>
<td></td>
</tr>
<tr>
<td>Polyurethane tubing</td>
<td>0.46</td>
</tr>
<tr>
<td>TU series</td>
<td></td>
</tr>
</tbody>
</table>

**Specifications**

<table>
<thead>
<tr>
<th>Model</th>
<th>TUZ042S</th>
<th>TUZ0604</th>
<th>TUZ0805</th>
<th>TUZ106S</th>
<th>TUZ1208</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tubing O.D. (mm)</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Tubing I.D. (mm)</td>
<td>2.5</td>
<td>4</td>
<td>5</td>
<td>6.5</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Air</th>
</tr>
</thead>
</table>

**Max. Operating Pressure**

<table>
<thead>
<tr>
<th>Operating temperature (°C)</th>
<th>Max. operating pressure (MPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-20</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>60</td>
<td>0.8</td>
</tr>
</tbody>
</table>

**Number of cores**

- 2 cores
- 3 cores
- 4 cores
- 5 cores
- 6 cores

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Max. operating pressure MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>20°C</td>
<td>0.8</td>
</tr>
<tr>
<td>40°C</td>
<td>0.6</td>
</tr>
<tr>
<td>60°C</td>
<td>0.4</td>
</tr>
</tbody>
</table>

**Applicable fittings**

- One-touch fitting
- Insert fitting
- Miniature fitting (Hose nipple type)

**Min. bending radius**

<table>
<thead>
<tr>
<th>Model</th>
<th>X169 (Roll)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X170</td>
<td></td>
</tr>
<tr>
<td>X171</td>
<td></td>
</tr>
<tr>
<td>X172</td>
<td></td>
</tr>
<tr>
<td>X204</td>
<td></td>
</tr>
</tbody>
</table>

**Material**

- Special polyurethane

**Note**

- The minimum bending radius means the value measured by the method shown in the figure on the left below at the temperature of 20°C when the tube is bent. The minimum bending radius assumes static piping. If the tube is used in a moving part, provide extra length to the tube.
- Check the bending radius recommended by the flexible protection tube manufacturer for sure if the tube is used in the flexible protection tube.
- In addition, refer to page 477 for abrasion.

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**Precautions**

Be sure to read this before handling the products. Refer to back page 50 for Safety Instructions and pages 13 to 17 for Fittings and Tubing Precautions.

**Caution**

1. Please consult with SMC if using for any fluids other than air.
2. Abnormal temperature rise caused by adiabatic compression may result in the tube bursting.
3. The value of the minimum bending radius is measured at the temperature of 20°C as shown in the figure below.
4. As a result of product design characteristics, there are cases of very slight leakage.

**How to measure the minimum bending radius**

Bend the tube into a U shape at a temperature of 20°C. Fix one end and bend the loop gradually. Measure 2R when the tube breaks or is crushed.
How to Order

Tube length per roll: **1, 2, 3, 4, 5, 10, 20 m**

**TUZ 0425 - 12345 A - X172**

- **Color**
  - Symbol: Color
  - 1: Black
  - 2: White
  - 3: Red
  - 4: Blue
  - 5: Yellow
  - 6: Green

- **Inside of the roll**
  - Yellow
  - Blue
  - Red
  - White
  - Black

- **Multi-core, multi-color specification**
  - Symbol: Number of cores
  - X169: 2 cores
  - X170: 3 cores
  - X171: 4 cores
  - X172: 5 cores
  - X204: 6 cores

- **Tube length per roll [m]**
  - Symbol: Length
  - A: 1
  - B: 2
  - C: 3
  - D: 4
  - E: 5
  - F: 10
  - G: 20
  - H: 50
  - J: 100

Tube length per roll: **50 m**

**TUZ 0425 - 12345 H - X172**

- **Color**
  - Symbol: Color
  - 1: Black
  - 2: White
  - 3: Red
  - 4: Blue
  - 5: Yellow
  - 6: Green

- **Inside of the roll**
  - Yellow
  - Blue
  - Red
  - White
  - Black

- **Multi-core, multi-color specification**
  - Symbol: Number of cores
  - X169: 2 cores
  - X170: 3 cores
  - X171: 4 cores
  - X172: 5 cores
  - X204: 6 cores

- **Tube length per roll [m]**
  - Symbol: Length
  - H: 50

Tube length per roll: **100 m**

**TUZ 0425 - 12345 J - X172**

- **Color**
  - Symbol: Color
  - 1: Black
  - 2: White
  - 3: Red
  - 4: Blue
  - 5: Yellow
  - 6: Green

- **Inside of the roll**
  - Yellow
  - Blue
  - Red
  - White
  - Black

- **Multi-core, multi-color specification**
  - Symbol: Number of cores
  - X169: 2 cores
  - X170: 3 cores
  - X171: 4 cores
  - X172: 5 cores
  - X204: 6 cores

- **Tube length per roll [m]**
  - Symbol: Length
  - J: 100

Please contact SMC for delivery.

Wear Resistant Flat Tubing
Multi-core, Multi-color Specification **TUZ Series**

KQ2  KQB2  KS  KX  KM  KF  M  H/DL  L/LL  KC  KK  KK130  DM  KDM  KB  KR  KA  KQ2  KG  KFG2  MS  KKA  KP  LQ  MQR  T  IDK

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Piping

1. Preparation before piping
Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the piping thread or the seal material to go in.
The minimum bending radius assumes static piping. If the tube is used in a moving part, provide extra length to the tube. Check the bending radius recommended by the flexible protection tube manufacturer for sure if the tube is used in the flexible protection tube.

Caution
1. Do not use in locations where the connecting threads and tube connection will slide or rotate.
The connecting threads and tube connection will come apart under these conditions.
Use rotary type one-touch fittings (KS, KX series) in cases where sliding or rotation will occur.
2. Use the tube at or above the minimum bending radius. Using below the minimum bending radius can cause breakage or flattening of the tube.
3. Never use the tube for anything flammable, explosive or toxic such as gas, fuel gas, or cooling mediums, etc.
Because the contents may penetrate outward.
4. Use the suitable fittings for the tube size.

Caution
1. Confirm the specifications.
Products represented in this catalog are designed only for use with compressed air system applications (including vacuum). Do not use at pressure or temperature beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)

2. In case of using the product for medical care
This product is designed for use with compressed air system applications for medical care purposes. Do not use in transfer applications to a human living body, or in contact with human bodily fluids, body tissues.

Warning
1. Types of fluid
This product is designed for use with compressed air.

2. In case of excessive condensation
Excessive condensation in compressed air may cause malfunction of pneumatic devices. Installation of an air dryer, water separator before filter is recommended.

3. Drain flushing
If condensation in the drain bowl of an air filter is not emptied on a regular basis, the condensation will enter the outlet side, causing malfunction of pneumatic devices. If the drain flushing is difficult, installation of a filter with an auto drain option is recommended.
For compressed air quality, refer to SMC’s “Air Preparation Equipment Model Selection Guide.”

Caution
1. Do not use in locations having an explosive atmosphere.
2. Do not operate in locations where vibration or impact occurs.
3. In locations near heat sources, block off radiated heat.

Warning
1. Perform periodic inspections to check the following problems and replace the tube, if necessary.
a) Cracks, gouges, wearing, corrosion
b) Air leakage
c) Twists or crushing of tube
d) Hardening, deterioration, softening of tube
2. Do not repair or patch the replaced tube or fittings for reuse.

Caution
1. Confirms model number, size, etc. before installing.
Check if there is damage, gouge, crack, etc. on the tube.
2. When the tube is connected, consider factors such as changes in the tubing length due to pressure, and allow sufficient leeway.
3. Do not apply unnecessary forces such as twisting, pulling, moment loads, etc. on fittings and tube.
This will cause damage to fittings or flattening, bursting or disconnection of tube, etc.
4. Mount so that tube is not damaged due to tangling.
This will cause flattening, bursting or disconnection of tube, etc.

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1. Do not use at pressure or temperature beyond the range of specifications, as this can cause damage or malfunction.
(Refer to the specifications.)

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For compressed air quality, refer to SMC’s “Air Preparation Equipment Model Selection Guide.”

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2. Do not operate in locations where vibration or impact occurs.
3. In locations near heat sources, block off radiated heat.

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